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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/635,395	08/05/2003	Vahe Adamian	10021239-1	1182

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EXAMINER	
NATALINI, JEFF WILLIAM	

ART UNIT	PAPER NUMBER
2858	

DATE MAILED: 04/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/635,395	ADAMIAN, VAHE	
	Examiner	Art Unit	
	Jeff Natalini	2858	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) *18-72* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-7,9-12,14 and 15* is/are rejected.

7)☒ Claim(s) *4,8,13,16 and 17* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 August 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08). Paper No(s)/Mail Date *11/19/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Election/Restrictions

1. Claims 18-72 withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on March 4, 2005.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. One drawling should read on claimed subject matter so that one could look at the drawling and easily understand the invention. Please include a drawling that will show all parts of at least claim 1 (for example a flowchart similar to figures 13-18 but not as specific) for publication purposes if case is patented (presently one must flip through all the figures to understand the invention) . No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an

application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because of the following informalities:

The interchangeable use of "through calibration" and "thru calibration" needs to be corrected. Even though it is stated in paragraph [22] pg 16 of the specifications that through is equivalent to thru, it one convention should be adopted and kept throughout the specification. This needs to be also corrected in at least figs 6-9, 17, and 18; as well as claims 1, 2, 4 (in the coefficients), 5, and 10.

Appropriate correction is required.

Claim Objections

4. Claims 1 and 14 is objected to because of the following informalities:

- In regard to claim 1, which states "measuring a DUT" in the step after "calculating a shifted electrical length ..." , this is unclear, as one skilled in the art would not understand what/how the DUT is to be measured. This statement is vague and needs to be made more clear so that one of ordinary skill would be able to perform the method claimed (for example "measuring a s-parameter of the DUT", "measuring a response of the

DUT", etc...). Also it is stated that the method claimed is for the purpose of measuring a DUT, so it is unclear how in the process of measuring a DUT (purpose of method claimed) you measure a DUT (in the method claimed).

Claim will be examined as best understood.

- In regard to claim 14, there is no antecedent basis for "said ten error coefficients", this will be examined as it was introduced in this claim.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krekels et al. (6081125).

In regard to claim 1, Krekels et al. discloses a method of measuring a DUT (abstract) comprising the steps of: providing a vector network analyzer having at least two measurement ports (abstract, fig 2 or fig 10);

measuring a reflection characteristic of a high reflect calibration standard at each measurement port, measuring forward and reverse reflection and transmission characteristics of a line calibration standard, measuring forward and reverse reflection

and transmission characteristics of through calibration standard, measuring forward and (col 1 line 43-52 describes the calibration techniques and col 5 line 35-45),

calculating error coefficients for said at least two measurement ports based upon results in said steps of measuring (col 6, specifically equations 18, 19, and 20)

measuring a DUT (col 10 line 64 – col 11 line 7)

correcting for systematic errors in said step of measuring said DUT based upon said error coefficients to yield a corrected S-parameter matrix (col 11 line 60 – col 12 line 18);

and shifting a reference plane for each element of said corrected S-parameter matrix to coincide with a DUT measurement plane (col 11 line 52-67 and col 13 line 51-55).

Krekels et al. does not specifically disclose performing a source terminated through calibration and a locally terminated through calibration and specifically calculating a shifted electrical length attribute to said calibration standards based on the measuring.

Krekels discloses a through connection for calibration purposes (col 4 line 61 – col 5 line 6) and multiple connections and switching states take place during through calibration (col 9 line 12-28); also there is a desired phase change due to length change (col 12 line 66-67)

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Krekels et al. to measure forward and reverse characteristics of a source terminated through connection and a locally terminated through connection in

order to take into account all system errors for object (DUT) measurement (abstract) and to calculate the change (shift) in electrical line length in order to have the desired phase change (col 12 line 66-67).

In regard to claim 14, Krekels discloses wherein ten error coefficients are determined (col 18 line 45-47).

Krekels et al. lacks specifically stating that forward and reverse reflection tracking error coefficients are determined using a boundary condition wherein an argument of reflection tracking is zero at DC.

Krekel et al. states that in measuring three calibration standards including through which would be known in the art to calculate forward and reverse reflection characteristics (col 18 line 48-63 talks of the calibrations) to recover all error coefficients, two must be unequal to zero, which leaves cases where one condition is at zero (col 18 line 39-47) would be at direct current.

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Krekels et al. to calculate forward and reverse reflection coefficients using a boundary condition where an argument is zero at DC in order to determine the calibration network standards (col 18 line 63-64).

7. Claims 2, 3, 5, and 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krekels et al. (6081125), as applied to claim 1 above, and in view of Bockelman et al. (5793213).

In regard to claim 2, 5, 9, and 10, Krekels et al. contains two measurement ports that are connected to fourports (abstract) and wherein tracking error coefficients are calculated using through calibration standard for each pair (col 15 line 60 - col 16 line 5).

Krekels et al. lacks wherein said vector network analyzer comprises more than two measurement ports and wherein said steps of measuring are repeated for all direct pairs of said measurement ports and further comprising the step of measuring a locally terminated through calibration standard for all indirect pairs of measurement ports, where forward and reverse reflection characteristics are measured in a through calibration standard.

Bockelman et al. teaches a vector network analyzer comprising more then two measurement ports (fig 2; shows n ports) and wherein a through calibration standard is done between each of the measurement ports (abstract- 2nd sentence; interconnection seen in figure 4) where forward and reverse reflection characteristics are measured in a through calibration standard (fig 4 (forward and reverse lines for each pair)). It would be obvious to one known in the art that in performing through calibration, they would be able to perform source terminated and locally terminated through calibration.

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Krekels et al. to have more than two ports and determine a through calibration for all pairs (indirect and direct) of measurement ports and measuring forward and reverse characteristics in through calibration techniques (source

or locally terminated) as taught by Bockelman et al. in order to provide a desired level of mode conversion (end of abstract).

In regard to claim 3, Krekels et al. lacks calculating a shifted electrical length between all pairs using load match and source match error coefficient terms.

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Krekels et al. to calculate a shifted electrical length between all pairs using load match and source match error coefficient terms in order for the matrix X'2 to be obtained (col 12 line 52) for all calibration values and apply the desired phase change accordingly (col 12 line 66-67).

In regard to claim 11, Krekels et al. disclose a vector network analyzer comprising a multiport test set (abstract) and switch matrix (fig 10 (switch Ts1 and Ts2) having more than two measurement ports (1, 2, 41, 42).

In regard to claim 12, Krekels et al. teaches determining the type of high reflect calibration standard (col 1 line 43-48).

8. Claims 6, 7, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krekels et al. (6081125) and Bockelman et al. (5793213) as applied to claim 2 above, and in further view of Cannon et al. (4816767).

In regard to claim 6, as seen above Krekels et al. as modified, detects calibration standards for all direct and indirect pairs.

Krekels et al. as modified lacks wherein in detecting error coefficients in each calibration standard error tracking coefficients are calculated by using a process for all pairs.

Cannon et al. teaches determining s-parameters by averaging together all the samples that are taken at the same frequency (col 13 line 16-22).

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Krekels et al. to use an averaging process when detecting error coefficients for all pairs as taught by Cannon et al. in order to lower system noise and enhance dynamic range (col 13 line 20-22).

In regard to claim 7, Krekels et al. as modified teaches calculating a shifted electrical length for each direct and indirect pair a different result is determined each time (Krekels et al. - col 12-13, equations 61-63).

In regard to claim 15, Krekels et al. teaches wherein the step of shifting comprises modifying an argument of respective s-parameters to respective ones of said shifted electrical lengths (col 12 equation 62).

Allowable Subject Matter

9. Claims 4, 8, 13, 16, and 17 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim (all objections to the base claim would have to be corrected) and any intervening claims.

In regard to claim 4, the prior art does not teach or render obvious the method containing the formula claimed, wherein both solutions of S21 is fit to a straight line,

where the solution having a y-intercept closest to zero is the correct solution and represents the electrical delay in combination as claimed.

In regard to claim 8, the prior art does not teach or render obvious wherein said shifted electrical length between proximal pairs is determined by averaging a shifted electrical length between said direct pair and said indirect pair having respective proximal pair measurement ports in common in combination as claimed.

In regard to claim 13, the prior art does not teach or render obvious wherein said step of determining further comprises calculating a characteristic of said high reflect calibration standard, fitting arguments of two possible solutions to a straight line, identifying which solution is closest to zero phase at DC in combination as claimed.

In regard to claim 16, the prior art does not teach or render obvious wherein the step of shifting the reference plane comprises adjusting each element of the s-parameter matrix according to the formula as claimed in combination as claimed.

In regard to claim 17, the prior art does not teach or render obvious wherein calculating the shifted electrical length comprises calculating a characteristic of said high reflect calibration standard, fitting an argument of said characteristic to a straight line, and using a slope of said straight line to calculate a shifted electrical length in combination as claimed.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Blackham et al. (6060888) teaches using known electrical length for correcting a reflection measurement in a through calibration standard. Sequeira et

al. (4853613) teaches computing the electrical length as a function of measured parameters in a calibrated network analyzer. Martens (6832170) teaches deriving s-parameteres and being able to convert back and forth between s-parameters and t-parameters. Other Adamian patents of record (not necessarily prior art) are 6826506, 6744262, and 6757625.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeff Natalini whose telephone number is 571-272-2266. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lefkowitz can be reached on 571-272-2180. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jeff Natalini

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PRIMARY EXAMINER